Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
Digital Data Transmission Within the Video Portion of Television Broadcast Station Transmissions	)	MM Docket No. 95-42

To: The Commission

COMMENTS OF YES! ENTERTAINMENT CORPORATION

YES! Entertainment Corporation ("YES!") respectfully submits these comments with respect to the Commission's proposals in the above-referenced proceeding.

Introduction

In October 1993, YES! began marketing a children's toy, "TV Teddy," that responds by voice at periodic intervals during the story line of children's programs recorded on associated VCR cassettes. These VCR programs have included, for example, "The Tale of Peter Rabbit," "Rikki Tikki-Tavi," "Thomas the Tank Engine," "The Railway Dragon," "Cricket in Times Square," and "The Berenstain Bears and the Wild Wild Honey." Since that time, YES! has sold approximately 314,000 "TV Teddy" toys.

In light of the popularity of TV Teddy, YES! sought Commission approval in November 1993 to encode similar signals

into television broadcast programs.[1/] Under this proposal, the voice of the teddy bear would be activated by encoding a signal into left-hand "overscan" portion of the active video. The YES! request relied upon approvals by the Mass Media Bureau of three other interactive toy proposals in 1986, involving either the encoding of audio tones onto the normal sound track or the encoding of visual signals into the storyline.[2/]

In its November 1993 request, YES! noted that preliminary tests by Capital Cities/ABC, Inc. had confirmed that the TV Teddy signal would be invisible and inaudible to television viewers, with or without use of the bear. After the Commission staff requested further tests, YES! submitted the results of those tests in January 1994.[3/] The sample of 102 TV sets selected for these tests included various models of all of the 15 most popular brands (among others), sizes from under 10 to over 50 inches, and 10 rear projection models. In none of these 102 models was the measured overscan less than the pulse width of the TV Teddy signal (approximately 2.4%). These results are consistent with an independent study, which recently measured

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[1/] The YES! request has been placed in the docket file of this proceeding. Notice ¶ 21 & n.10.

[2/] Letter from Chief Mass Media Bureau to Charles H. Helein, Aug. 5, 1986; Letter from Chief, Mass Media Bureau to Robert L. Pettit, Oct. 30, 1986; Letter from Chief, Mass Media Bureau to Brian Owens (undated). Copies of these letters are attached hereto.

[3/] A copy of this filing is attached hereto.

overscan data on 100 TV sets and found that the left overscan ranges from 3% to 7%, with a mean of as much as 4.7%.[4/]

I. THE YES! PROPOSAL DOES NOT POSE ANY REAL RISK OF PERCEPTIBLE DEGRADATION OF THE VIDEO SIGNAL.

The Commission notes that its goal in this proceeding is to "encourage the use of television signals for ancillary data transmission and to permit new technological developments." Notice ¶ 34. Indeed, fostering such emerging technologies and services is "the policy of the United States," and opponents of such proposals "have the burden to demonstrate that [they are] inconsistent with the public interest." 47 U.S.C. § 157(a).[5/] On the other hand, YES! agrees that the Commission should prevent uses of data transmission "that would perceptibly degrade the video signal." Notice ¶ 29. As noted above and in its prior filings, YES! believes that the TV Teddy signal poses no real risk of any such degradation.

The Commission appears to recognize as much, but raises questions concerning the possibility of future overscan reductions in NTSC television sets. Notice ¶ 30. Despite the advent of solid state technology, however, the foregoing studies confirm that the amount of overscan used in TV receivers today still comfortably exceeds the margin required for use of the YES!

[4/] Richards & DiGiulio, Results of a New Receiver Overscan Survey, SMPTE J., Feb. 1994, at 94-99.

[5/] See also 47 U.S.C. § 157(b) (one-year timetable for FCC review of new technologies and services).

technology. Moreover, there appears to be no evidence that reduction of overscan by NTSC manufacturers will occur in the foreseeable future. Indeed, the advent of ATV technology would appear to make it far less likely that manufacturers will undertake significant changes to NTSC sets in the interim.

Nor would it make sense to forestall the introduction of promising new technologies and services, and their potential for major contributions to children's informational and educational programming,[6/] because some day smaller computer terminals might replace larger NTSC television sets. See Notice ¶ 30. Since 99% of all U.S. households currently have NTSC television sets,[7/] there appears to be little prospect of reliance on computer monitors for viewing television programs in the foreseeable future.[8/] Moreover, such computers would not appear to be the kind of apparatus that the Commission has viewed

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[6/] See 47 U.S.C. § 303a. For example, YES! now has follow-on plans to develop an answer box for children's programs, which would create interactive educational opportunities.

[7/] 1994 Television and Cable Factbook I-21.

[8/] Cf. Sanyo Mfg. Corp., 58 R.R.2d 719, 722 (1985), aff'd after remand sub nom. Association of Maximum Service Telecasters v. FCC, 853 F.2d 973 (D.C. Cir. 1988):

> ". . . it must be emphasized that the overwhelming majority of homes have more than one broadcast-television receiver, and those who purchase a specialized device such as the SSDD will by all odds have at least one all-channel, broadcast-television receiver at hand."

as "designed to receive" television pictures.[9/] YES! understands, for example, that computers cannot receive such pictures unless the customer independently purchases and installs a separate card at substantial additional expense. In short, given the statutory mandate for promoting new technologies, there appears to be no justification for "phasing out" (Notice ¶ 30) an innovative technology that creates no "discernable degradation," merely because of the speculative possibility that NTSC sets will be redesigned sometime in the future before the advent of ATV technology.

II. YES! AGREES THAT TELEVISION LICENSEES SHOULD RETAIN THE RIGHT TO DELETE OVERSCAN DATA AT THEIR DISCRETION.

As noted above, YES! believes that its proposal can offer significant educational and entertainment benefits for children and add to the diversity of programming now available to them. For this reason, YES! anticipates widespread interest by broadcasters in its proposal, and any programming based upon the YES! proposal would be undertaken in full cooperation with them.

YES! concurs in the Commission's view that this is a programming choice that should ultimately be left in the discretion of the broadcast licensee, which should retain the ability and authority to delete the YES! signal. As the

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[9/] See 47 U.S.C. § 303(s). See Association of Maximum Service Telecasters v. FCC, 853 F.2d 973 (D.C. Cir. 1988) (SSDD device, like television monitors, not subject to regulation under All-Channel Receiver Act).

Commission notes, "overscan" signals like that proposed by YES! "are limited to specific places in the picture and are easily deleted by the licensee." Notice ¶ 33. For these reasons, YES! believes that its proposal is fully consistent with the Commission's primary concern, i.e., to permit the broadcaster to determine for itself whether and how to use the active program video for secondary purposes.

Conclusion

For the reasons stated above, the Commission should approve the YES! request as consistent with the requirements proposed in the Commission's Notice.

Respectfully submitted,

YES! ENTERTAINMENT CORPORATION

William R. Richardson, Jr.

WILMER, CUTLER & PICKERING
2445 M Street, N.W.
Washington, D.C. 20037
(202) 663-6000

Its Counsel

June 23, 1995

AUG 5 1986

Mr. Charles H. Helein
Dow, Lohnes & Albertson
1255 23rd Street, N.W.
Washington, D. C. 20037

Dear Mr. Helein:

This is in response to your letter of April 18, 1986, on behalf of Axlon, requesting Commission confirmation that a system for the remote manipulation of objects by encoded tones in television programming would not conflict with the broadcast television rules. The Axlon system would employ audible tones within the sound track of syndicated cartoon programs to activate and control toy figurines representing characters in the programs. You indicate that the audio tones would be indistinguishable from the sounds associated with the storyline and, therefore, are "integral to the program itself."

A review of the Communications Act and the Commission's rules reveals no bar to the broadcast of a program that includes encoded tones that are an integral and indistinguishable part of the normal soundtrack, but that also serve a secondary purpose. Additionally, because the tones, as described in your letter, are not special signals, the Commission's special signal policy would not be invoked. See Public Notice, 22 FCC 2d 779 (1970). We also believe that the Axlon transmissions would be consistent with the Commission's mandate under section 303 of the Act to "(s)tudy new uses for radio, provide for experimental uses of frequencies, and generally encourage the larger and more effective use of radio in the public interest."

In view of the fact that the Axlon tones as you describe would be an integral part of the television program service, the proposed Axlon system would not appear to conflict with any of the Commission's broadcast rules or policies.

Sincerely,

(SIGNED) *James C. McKinney*

James C. McKinney
Chief, Mass Media Bureau

DOW, LOHNES & ALBERTSON

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TELECOPIER (202) 659-0059

CABLE "DOWLA"

TELEX 425546

WRITER'S DIRECT DIAL NO.

(202) 857-2760

April 18, 1986

BY HAND

William H. Johnson, Esq.
Deputy Chief
Mass Media Bureau
Federal Communications Commission
Office 314
1919 M Street, N.W.
Washington, D.C. 20554

Dear Mr. Johnson:

On behalf of our client, Axlon, Sunnyvale, California, we request confirmation that the following proposed operations will not conflict with Commission policy.

As an integral part of television broadcast programming, Axlon has developed an advanced technology by which to manipulate remote objects. In the initial generation stage of this advanced technology, the objects to be manipulated will be toys or dolls replicating cartoon characters appearing in syndicated cartoon programs broadcast by conventional TV stations. As part of the cartoon sound track, audio tones (that will be indistinguishable from the sounds associated with the cartoon storyline, and hence, are integral to the program itself) will be received by an analog audio device in the viewer's home. The tones are then fed by cable connections into battery powered microprocessors. The cartoon character replicas in the viewer's home are manipulated using the key pads for each microprocessor.

ONE RAVINIA DRIVE SUITE 1300 ATLANTA, GEORGIA 30346 TELEPHONE (404) 395-8800
TELECOPIER (404) 395-8874 CABLE "DOWATL" TELEX 4995255
91 CATHEDRAL STREET ANNAPOLIS, MARYLAND 21401 TELEPHONE (301) 263-0043

This system employs notch filtering alternating the sound track of the cartoon program 30db at 3-5 KHz while maintaining the tone 2db above the nominal level of the sound track. The audio link and microprocessors will be approved as required by the FCC's equipment authorization program under Part 15.

The system has been developed beyond the testing stage and is ready for commercial use. Axlon has received several proposals from manufacturers that wish to make the figurines or dolls replicating the cartoon characters. Time is therefore of great importance. The Bureau's confirmation that this system is not subject to any Commission policies that would restrict its use as described herein, will permit the first generation of this technology to prove its practical application and commercial value. Thereafter, expansion of the system's concept will be made to new applications including educational and instructional uses.

Your prompt attention and response will be appreciated. If there are any questions, please contact the undersigned.

Very truly yours,

Charles H. Helein

CHH:bb

FEDERAL COMMUNICATIONS COMMISSION

WASHINGTON, D.C. 20554

OCT 30 1986

IN REPLY REFER TO:

Mr. Robert L. Pettit
Wiley, Rein & Fielding
1776 K St. N.W.
Washington, D.C. 20006

Dear Mr. Pettit:

This is in response to your letter of October 7, 1986, requesting confirmation that a client's proposed system for activating remote objects such as toys from television broadcasts does not conflict with Commission policy. You indicate that the technology used in this system is similar to that of the Axlon system, which we previously found would not conflict with the Commission's rules. However, you state that your client's technique differs from that used by Axlon in that it uses visual, rather than aural, signals integrated into the storyline to activate the remote objects.

As you know, other parties have developed systems that use tones encoded on the television audio signal to control remote devices. The tones used by these systems are integrated into the normal program audio in a manner such that they are an integral and indistinguishable part of the primary television service and, therefore, are intended for use by all viewers. We have found that there is no bar in either the Communications Act or the Commission's rules to broadcast a program that includes encoded tones that are an integral and indistinguishable part of the normal soundtrack, but also serve a secondary purpose. Inasmuch as we have found that the use of these audio systems are acceptable under the Commission's rules we could, therefore, approve the use of video systems where the coded information was integrated into the storyline.

To the extent that the encoded visual signals you describe would be indistinguishable from the normal pictures associated with the program's storyline and, therefore, "integral to the program itself," use of your client's system would not appear to conflict with any of the Commission's broadcast rules or policies. Additionally, because the video signals are not special signals, the Commission's special signal policy would not be invoked.

This opinion, of course, does not constitute any Commission endorsement of the system you have described. Moreover, since you have provided no specific information concerning the manner in which the visual signals are to be integrated into the normal television video signal or program, it is not possible to state whether any particular program that used your client's system would comply with the standards set forth above. That is a determination that would have to be made by those broadcasting the program in the first instance.

I trust this is responsive to your inquiry.

Sincerely,

(SIGNED) *James C. McKinney*

James C. McKinney
Chief, Mass Media Bureau

FEDERAL COMMUNICATIONS COMMISSION

WASHINGTON, D.C. 20554

IN REPLY REFER TO:

Mr. Brian Owens
Brisun Entertainment Group
34-12 36th Street
Astoria, N.Y. 11106

Dear Mr. Owens:

Your letter of August 21, 1986, to Mr. Frank Rose of the Commission's Office of Engineering and Technology, has been referred to the Mass Media Bureau for reply with respect to its request concerning transmission of audio tones in television broadcasts to control the C.H.U.M. robot. In your letter, you request confirmation that broadcasting of a program that includes such tones does not conflict with any of our regulations. Your attached description of the robot system indicates that the audio control tones would be hidden in the soundtrack and, therefore, indistinguishable from the audio of the program itself.

A review of the Communications Act and the Commission's rules reveals no bar to the broadcast of a program that includes encoded tones that are an integral and indistinguishable part of the normal soundtrack, but that also serve a secondary purpose. Additionally, because the tones, as described in your brochure, are not special signals, the Commission's special signal policy would not be invoked. See "Public Notice", 22 FCC 2d 779 (1970). We also believe that broadcast transmissions of the hidden beeper signals described in your letter would be consistent with the Commission's mandate under Section 303 of the Act to "(s)tudy new uses for radio, provide for experimental uses of frequencies, and generally encourage the larger and more effective use of radio in the public interest."

In view of the fact that the tones as you describe would be an integral part of the television program service, the proposed system would not appear to conflict with any of the Commission's broadcast rules or policies. However, I wish to emphasize that this opinion does not constitute an endorsement, or otherwise indicate any position on the part of the FCC, with respect to the use of the system described in your letter in connection with broadcast television service. In addition, the opinion rendered herein applies only to use of the C.H.U.M. system in the manner described above. Other uses of this technology in a broadcast context may raise regulatory issues beyond those examined in this response.

Sincerely,

James C. McKinney
Chief, Mass Media Bureau

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WILLIAM R. RICHARDSON, JR.
DIRECT LINE (202)
663-6038

January 27, 1994

BY HAND

Douglas W. Webbink, Chief
Policy and Rules Division
Mass Media Bureau
Federal Communications Commission
2025 M Street, N.W., Room 8010
Washington, D.C. 20554

Dear Mr. Webbink:

On behalf of Yes! Entertainment Corporation, and in response to your request by letter dated November 24, 1993, this provides additional information concerning the proposal by Yes! to encode a signal in the active video portion of the broadcast transmission, in order to activate the voice of its interactive toy, "TV Teddy."

As noted in my letter of November 8, 1993, the TV Teddy signal is designed to take advantage of the "overscan" characteristic of television receivers. You have asked for a more detailed description of the proposed signal -- "type of modulation, signal level, data rate, etc." As set forth in the attached engineering report, the TV Teddy signal involves pulse amplitude modulation, a maximum signal level of 100 IRE, and a data rate of 14,160 pulses per second.

Your November 24 letter also asked that Yes! test a larger sample of television receivers, to include current as well as older models, and a variety of sizes to include "projection" sets. As the attached report indicates, Yes! engineers recently sampled all 30 television receiver models on display and available to them at the "Good Guys" outlet in Danville, California, a California retailer analogous to (and a competitor of) Circuit City, and six more available at another Good Guys outlet in San Francisco. This sample included a variety of sizes and models currently viewed as the most popular with consumers. Yes! supplemented this Good Guys sample with 66 other sets located at Yes! offices or the homes of its employees, or previously sampled by Capital Cities/ABC, Inc. The 102 set sample included various models of all of the 15 most popular brands among others (see Attachment 6), sizes from under 10 to over 50 inches (see Attachment 4), and ten rear projection models. See generally Attachment 1.

The first step in the study was to measure the extent of overscan and then to compare it to the TV Teddy pulse. As the report indicates, in none of these 102 models was the measured overscan less than the pulse width of the TV Teddy signal. Yes! also validated by visual observation, in the set with the smallest measured overscan that was available, that the TV Teddy signal was not in fact visible. This was done using a standard

TV Teddy packout tape on a VHS recorder, which as noted in the report would be likely to overstate the extent of any problem.

As described in the report, these results are fully consistent with the Yes! development experience, which has identified no visible problems with the signal on sets at Yes! offices. The report is also consistent with the absence of any complaints of visual degradation from any of the over 200,000 purchasers of the VHS tape version of the product. As the report explains, the signal as broadcast would have an even narrower pulse than that used on the VHS tape version; thus, the likelihood of any visual appearance of the signal during broadcast, even in part, appears exceedingly remote.[1/]

Your letter also asks Yes! to address the issue of signal display on "multimedia" computer monitors. Good Guys does not sell such multimedia computers, and Yes! was unable to locate one in order to test it. Since 99% of all U.S. households currently have NTSC television sets,[2/] there appears to be little prospect of reliance on such multimedia computers for viewing television programs in the foreseeable future.[3/] Moreover, such

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1/ Your letter asks "how . . . the proposed signal appear[ed] when it was observed." We have enclosed a videotape of what the signal would look like if it had appeared (which it did not). This videotape shows the signal on a monitor with no overscan, first in its entirety, then at 50%, and finally at 25%.

2/ 1994 Television & Cable Factbook I-21.

3/ Cf. Sanyo Mfg. Corp., 58 R.R.2d 719, 722 (1985), aff'd after remand sub nom. Association of Maximum Service Telecasters

(continued...)

computers would not appear to be the kind of apparatus that the Commission has viewed as designed to receive television pictures;[4] Yes! understands, for example, that computers cannot receive such pictures unless the customer independently purchases and installs a separate card at substantial additional expense. It would also be difficult to determine whether any appearance of the signal on such a computer screen could be said to "detract from normal viewing" on such screens,[5] in which the user already expects to encounter a wide variety of symbols and signals.

I hope this letter has answered all of your questions adequately. As noted in my earlier letter, this proposed use of the active video appears fully consistent with prior Bureau rulings. See also Letter from Roy J. Stewart to Jane E. Genster, March 3, 1992. Yes! believes that its proposed use of the active video to permit a new form of interactivity also furthers the

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[3](...continued)
v. FCC, 853 F.2d 973 (D.C. Cir. 1988):

> ". . . it must be emphasized that the overwhelming majority of homes have more than one broadcast-television receiver, and those who purchase a specialized device such as the SSDD will by all odds have at least one all-channel, broadcast-television receiver at hand."

[4] See Association of Maximum Service Telecasters v. FCC, 853 F.2d 973 (D.C. Cir. 1988) (SSDD device, like television monitors, not subject to regulation under All-Channel Receiver Act).

[5] Revision of Programming and Commercialization Policies, 2 FCC Rcd 6822, 6826 (1987).

statutory policy of encouraging new technologies and the larger and more effective use of radio spectrum, and would significantly add to the diversity of program choices available for children. See 2 FCC Rcd at 6826. Indeed, it promises to create exciting new educational opportunities of the kind specifically encouraged by the Children's Television Act of 1990.

Because Yes! hopes to begin promoting potential broadcasts of TV Teddy in mid-February 1994, for broadcast in March 1994, it would appreciate a prompt ruling on this request.

Sincerely yours,

William R. Richardson, Jr.

Encls.
cc: Gordon Godfrey

Larry McCracken
Director of Engineering
Yes! Entertainment Corporation
3875 Hopyard Road, Suite 375
Pleasanton, California 94588

Overscan Measurement Summary

After measuring 102 models of televisions it was found that the TV teddy pulse will not be visible on any of the sets when viewing broadcast encoded programs. The following process was used to make this determination.

- Tested all TVs available with no selection process
- Measured new TVs at two Good Guys department stores
- Measured used TVs at homes of YES! employees and friends
- Total of 102 models tested
- Tested rear projection as well as CRT televisions
- Validated results by playing a TV Teddy packout VCR tape on the worst TV available in one of the stores with no visible TV Teddy signal

For details see the following Overscan Test Report.

Signature

1/27/94
Date

Overscan Test Report

Background:

TV Teddy is a talking bear which interacts with characters and cartoons being played on a VHS video cassette recorder. The technology was developed in a way which would also allow a TV Teddy encoded signal to be broadcast through existing commercial broadcast facilities. The video tape has stereo audio for the television speakers as well as the normal composite video signal for the picture. In order to create Teddy's voice we pulse amplitude encode an audio signal at the beginning of the active video so it wouldn't be visible to the viewer. TV Teddy's voice is encoded into each active video line from lines 22 through 257 on the even fields and lines 285 through 520 on odd fields. The encoding pulse (7.5-100 IRE) is located at the beginning of the active video. There are 236 pulses during each field for an average data rate of 14,160 pulses per second. For broadcast the encoded pulse width is 1.26 usec. The pulse width and location of the encoded pulse relative to horizontal sync are defined by the encoding process, and are fixed parameters in the encoder. These pulse timing parameters can not be changed by the broadcast facility.

In general, all television sets are designed with some overscan on the left and right sides of the picture. This is done so the viewed image will always fill the screen without leaving black edges. Since the circuit design, component tolerances and manufacturing assembly tolerances for televisions are not perfect, the manufacturer needs some overscan to simplify the manufacturing process and improve quality. According to Frank Davidoff, "A Survey of Television Blanking Width Problems", SMPTE (Society of Motion Picture & Television Engineers) Journal, Vol. 88, No. 3, March 1979, p. 149, the typical total overscan is 5-8% for home viewer television sets.

At this time the only TV Teddy encoded materials are the VHS tapes which have been produced and sold for several months. Throughout the TV Teddy product development process we used at least a dozen televisions without any visible signs of the encoded pulse on the screen. Approximately 200,000 TV Teddies were sold at Christmas and the Customer Service Manager has not heard of one comment or complaint about seeing the encoding signal on the screen.

The possibility of seeing this encoded signal will be even less with broadcast programming. Broadcast encoding will be done on 1" or D2 tape using a special encoder that has a narrower pulse width to increase the margin between the edge of our encoded pulse and the beginning of the visible video picture.

Purpose:

The purpose of this investigation was to quantitatively measure the possibility of the TV Teddy signal interfering with broadcast video transmission as viewed on consumer television receivers.

Strategy:

The strategy was to measure the overscan on a large number of televisions which were representative of the general population of home viewer sets. This could then be compared to the proposed TV Teddy broadcast signal timing and an estimate of the number of televisions with visible TV Teddy pulses could be calculated.

Simply playing encoded material through the TV under test would yield basic pass/fail information but would not identify margins. The procedure in Attachment 2 was used to accurately measure the leading edge and trailing edge overscan. For this report the only pertinent information is the leading edge overscan since the TV Teddy signal is a pulse at the beginning of the active video. A diagram of this timing is displayed in Attachment 7.

Data Gathering:

New and used televisions were tested. We tested all televisions available, concentrating on locations with multiple sets. Several stores were approached but the only retail store in our area which would allow us to spend a full day taking data was the Good Guys store in Dublin, California. It was originally estimated we would be able to test 50-60 different models in that store but we only had access to 30. Each set had to be hooked up and tested individually. The data taken at the Good Guys as well as that taken at employees' homes, etc. are contained in Attachment 1.

Attachment 6 shows the television market share by brand as reported in TV Digest, a weekly publication for broadcasting, cable, and consumer electronics fields. The brands tested during the overscan investigation are also identified. We tested brands representing 82% of the CRT display television models and 63% of the rear projection models. The sample consisted of models of many different sizes.

Results:

Of the 102 models tested, 92 were CRT displays with the remaining 10 being rear projection. The average time from horizontal sync to visible video was 11.89 usec for the CRT models and 11.21 usec for the rear projection models. The minimum times were 10.60 usec and 10.72 usec respectively. Attachment 3 contains general statistical calculations while Attachment 7 illustrates this graphically compared to the TV Teddy encoding pulse timing.

After gathering data, we needed to validate the results. Since we could not get back into the Dublin Good Guys for more testing, we went to another Good Guys store in San Francisco. Seven televisions were measured to find one with a low overscan, a Pioneer model (Test Number 97). A VCR was used to play a standard VHS TV

Teddy packout tape on this television . There was no visible TV Teddy encoding signal on the screen.

A comparison of time from horizontal sync to visible video versus diagonal picture size (Attachment 4) illustrates the general trend that as the size of the television increases the overscan decreases. All sets 40 inches and over were rear projection models. Since the ratio of rear projection sets to CRT sets in the market place is extremely low (0.0164 according to TV Digest), the overwhelming majority of consumers will follow the statistics for CRT display televisions which means more margin for the TV Teddy signal.

An analysis of the time from horizontal sync to visible video by brand (Attachment 5) appears to show that manufacturers have a broad spectrum of overscan.

Conclusion:

Measurements were taken on 102 different televisions covering a wide range of sizes and brands. Rear projection as well as the predominant CRT models were tested. In all cases the data shows that TV Teddy encoding pulses will not be visible during broadcast. In fact there is a safeguard of 0.24 usec (10.60 - 10.36 usec) even with the lowest measured television.

Attachment 1

Television Overscan Measurements Data

Test Number	Television Brand	Manufacturer Number	Model Number	Diagonal Screen Size (inches)	Leading Edge Overscan (usec)	Time From Horizontal Sync (usec)	Type	Comments
1	Sony	20	KV-20TR23	20	2.44	12.00	CRT	CPI Lab
2	Sony	20	KV-20TR23	20	2.28	11.84	CRT	CPI Lab
3	Sony	20	KV-27XBR10	27	1.76	11.32	CRT	Boardroom
4	Philips	11	27-K221SB03	27	1.60	11.16	CRT	Maria's
5	Emerson	2	TC1375	13	2.36	11.92	CRT	Maria's
6	Sharp	19	13SB50	13	3.44	13.00	CRT	Maria's
7	Sony	20	KV2670R	26	1.12	10.68	CRT	Maria's Neighbor
8	Sharp	19	13LV56A	13	3.64	13.20	CRT	Maria's Neighbor
9	Sony	20	KV32TS-20	32	1.36	10.92	CRT	Maria's Friend
10	Lloyds	7	L518	18	2.60	12.16	CRT	Maria's Friend
11	Hitachi	5	CT2033B	20	3.24	12.80	CRT	Patti's
12	RCA	14	EFR398WR	17	3.24	12.80	CRT	Patti's
13	RCA	14	FMR2723E	27	2.20	11.76	CRT	Holly's
14	GE	3	20GT420	20	2.72	12.28	CRT	Holly's
15	Magnavox	8	RR1345C101	13	2.28	11.84	CRT	Holly's
16	Zenith	22	SE2569W	25	2.60	12.16	CRT	Holly's Mom
17	Emerson	2	M1975R	19	2.00	11.56	CRT	Holly's Mom
18	Panasonic	10	CT9043	19	1.76	11.32	CRT	Holly's Friend
19	RCA	14	XL100	13	2.68	12.24	CRT	Holly's Friend
20	Zenith	22	A2508P	25	3.64	13.20	CRT	Holly's Brother
21	Emerson	2	VT1921	19	1.96	11.52	CRT	Holly's Brother
22	Sony	20	KV32XBR36	32	2.16	11.72	CRT	Dave's
23	Hitachi	5	CK-200	5	3.76	13.32	CRT	Dave's
24	Sony	20	KX-1901	19	3.64	13.20	CRT	Dave's
25	Panasonic	10	CT-13R20	13	2.96	12.52	CRT	Good Guys
26	Panasonic	10	CT-13R10	13	3.20	12.76	CRT	Good Guys
27	RCA	14	E09303KW	9	2.80	12.36	CRT	Good Guys
28	Goldstar	4	GCT1350M	13	1.48	11.04	CRT	Good Guys
29	Goldstar	4	CN14A10	13	1.56	11.12	CRT	Good Guys
30	Goldstar	4	CMS4841	13	1.24	10.80	CRT	Good Guys
31	JVC	6	C13CL4	13	2.36	11.92	CRT	Good Guys
32	Sharp	19	13EM50	13	3.28	12.84	CRT	Good Guys
33	RCA	14	E09301BT	9	2.20	11.76	CRT	Good Guys
34	Magnavox	8	RR1333C	13	2.12	11.68	CRT	Good Guys
35	Sony	20	KV8AD11GRAY	8	2.32	11.88	CRT	Good Guys
36	Magnavox	8	CCR095AT	9	2.28	11.84	CRT	Good Guys
37	Philips	11	13R201C4	13	1.52	11.08	CRT	Good Guys
38	Philips	11	13S250C1	13	2.00	11.56	CRT	Good Guys
39	Hitachi	5	31DX21B	31	1.64	11.20	CRT	Good Guys
40	Proscan	12	PS31122	31	2.44	12.00	CRT	Good Guys
41	Panasonic	10	CT27S15	27	2.08	11.64	CRT	Good Guys
42	Mitsubishi	9	CS313001	31	3.32	12.88	CRT	Good Guys
43	Toshiba	21	ST307	35	1.84	11.40	CRT	Good Guys
44	Toshiba	21	CF30C50	30	1.88	11.44	CRT	Good Guys
45	Toshiba	21	CF32C50	32	1.80	11.36	CRT	Good Guys
46	RCA	14	F31631SE	31	1.60	11.16	CRT	Good Guys
47	Toshiba	21	CN32C90	32	2.12	11.68	CRT	Good Guys
48	JVC	6	AV35BH4	35	1.04	10.60	CRT	Good Guys
49	Sony	20	KP46XBR25	46	1.16	10.72	Rear Projection	Good Guys
50	Sony	20	KP41EXR96	41	1.28	10.84	Rear Projection	Good Guys
51	RCA	14	P46730WK	46	1.68	11.24	Rear Projection	Good Guys
52	Toshiba	21	TP48C90	48	1.56	11.12	Rear Projection	Good Guys
53	Mitsubishi	9	50UX15K	50	2.28	11.84	Rear Projection	Good Guys
54	Hitachi	5	46EX3B	46	1.32	10.88	Rear Projection	Good Guys
55	Sony	20	KB-32TS36	32	1.88	11.44	CRT	Bill's
56	Mitsubishi	9	Unknown	25	2.04	11.60	CRT	Craig's
57	Realistic	15	16108	5	1.72	11.28	CRT	Craig's

Attachment 1

Television Overscan Measurements Data

Test Number	Television Brand	Manufacturer Number	Model Number	Diagonal Screen Size (Inches)	Leading Edge Overscan (usec)	Time From Horizontal Sync (usec)	Type	Comments
58	Mitsubishi	9	CS-3535K	35	2.24	11.80	CRT	Craig's
59	Radio Shack	13	16-232A	13	4.40	13.96	CRT	Craig's
60	Sharp	19	Unknown	13	2.00	11.56	CRT	Craig's
61	Toshiba	21	CX2033	20	2.96	12.52	CRT	Don's
62	Toshiba	21	CX2047J	20	2.44	12.00	CRT	Don's
63	Mitsubishi	9	CS2669R	26	1.80	11.36	CRT	Don's
64	Panasonic	10	CTL2042R	20	2.52	12.08	CRT	Don's
65	Mitsubishi	9	CK3502R	35	1.68	11.24	CRT	Don's
66	Toshiba	21	CZ2685	26	1.60	11.16	CRT	Don's
67	Mitsubishi	9	Unknown	35	1.92	11.48	CRT	Sol's
68	Mitsubishi	9	Unknown	44	2.60	12.16	Rear Projection	Sol's
69	Sony	20	KV-1515	15	2.72	12.28	CRT	Sol's
70	Zenith	22	SS1935W9	19	2.44	12.00	CRT	Sol's
71	Panasonic	10	CTN-31883	31	1.88	11.44	CRT	Mark's
72	Citek	1	7495A	25	3.00	12.56	CRT	Mark's
73	Mitsubishi	9	VS4001R	40	1.56	11.12	Rear Projection	Mark's Neighbor
74	Toshiba	21	TP5288J	52	1.88	11.44	Rear Projection	Mark's Neighbor
75	Mitsubishi	9	CS2010R	20	2.72	12.28	CRT	Mark's Neighbor
76	Zenith	22	JS2765S5	27	2.12	11.68	CRT	Richard's
77	Sanyo	17	AVM195	19	1.64	11.20	CRT	Larry's
78	Sears	18	934.4017005	9	2.68	12.24	CRT	Larry's
79	Goldstar	4	CR-407	13	2.24	11.80	CRT	Larry's
80	Samsung	16	TC-9865TB	19	2.56	12.12	CRT	Larry's
81	Sony	20	KV-20TR23	20	2.00	11.56	CRT	CA Conf Room
82	Mitsubishi	9	CS-20101	20	2.60	12.16	CRT	CA Conf Room
83	Sony	20	KV-19TR20	19	1.80	11.36	CRT	CA Conf Room
84	Philips	11	27K221SB03	27	2.48	12.04	CRT	Claudia's Friend
85	Sony	20	Unknown	26	2.24	11.80	CRT	Claudia's Friend
86	Philips	11	21CM4462	21	2.44	12.00	CRT	Claudia's
87	Toshiba	21	CF2668B	26	1.60	11.16	CRT	Claudia's
88	Toshiba	21	CF2027B	27	2.16	11.72	CRT	Claudia's
89	Sony	20	1380R	13	3.00	12.56	CRT	Measured by ABC
90	Sony	20	KV-1367	13	3.00	12.56	CRT	Measured by ABC
91	Zenith	22	SD-2593Y	25	3.00	12.56	CRT	Measured by ABC
92	Zenith	22	SG-2037W	20	3.00	12.56	CRT	Measured by ABC
93	Sony	20	KV27V55	27	2.50	12.06	CRT	Measured by ABC
94	Sony	20	KV25XBR	25	2.00	11.56	CRT	Measured by ABC
95	Sony	20	KV19TR20	19	2.50	12.06	CRT	Measured by ABC
96	Sony	20	KV1720	17	3.00	12.56	CRT	Measured by ABC
97	Pioneer	23	SDPY561Q	45	1.16	10.72	Rear Projection	Good Guys
98	Philips	11	27K221SB03	27	2.48	12.04	CRT	Good Guys
99	Sony	20	KV2670R	26	2.24	11.80	CRT	Good Guys
100	Philips	11	21CM4462	21	2.44	12.00	CRT	Good Guys
101	Toshiba	21	CF2668B	26	1.60	11.16	CRT	Good Guys
102	Toshiba	21	CF2027B	27	1.16	10.72	CRT	Good Guys

Notes:

1. The leading Edge Overscan was measured using the procedure in Attachment 2.
2. The Time From Horizontal Sync is the Leading Edge Overscan + 9.56 usec.
3. "Good Guys" TVs were new in a store while all others were used.

Attachment 2

Television Overscan Measurement Procedure

Purpose: To quantitatively measure the amount of leading and trailing horizontal overscan on the television active video image.

Method: A Waveform Generator was used to put a vertical white line on the television screen. This line was then moved to the left side of the screen until it was no longer visible and the time from the beginning of active video to the end of the white line was measured. The same procedure was used to measure the same parameter at the right side of the screen. Figure 2 illustrates the measurement periods.

Equipment:

Tektronix 1410 NTSC Generator
Tektronix TDS 544A Digitizing Oscilloscope
Radio Shack RF Modulator
75 ohm to 300 ohm matching transformer
Miscellaneous cables

Equipment Set Up:

1. Connect the equipment as shown in Figure 1. The RF Modulator has an internal 75 ohm load so no other termination is required. If the Television Under Test (TUT) does not have a "F" connector input for 75 ohm coax, use a 75 ohm to 300 ohm matching transformer and connect to the twin lead input.

2. Turn on power to all equipment.

3. Set the RF Mod to **CH 3** with the input switch at **75 Ohm.**

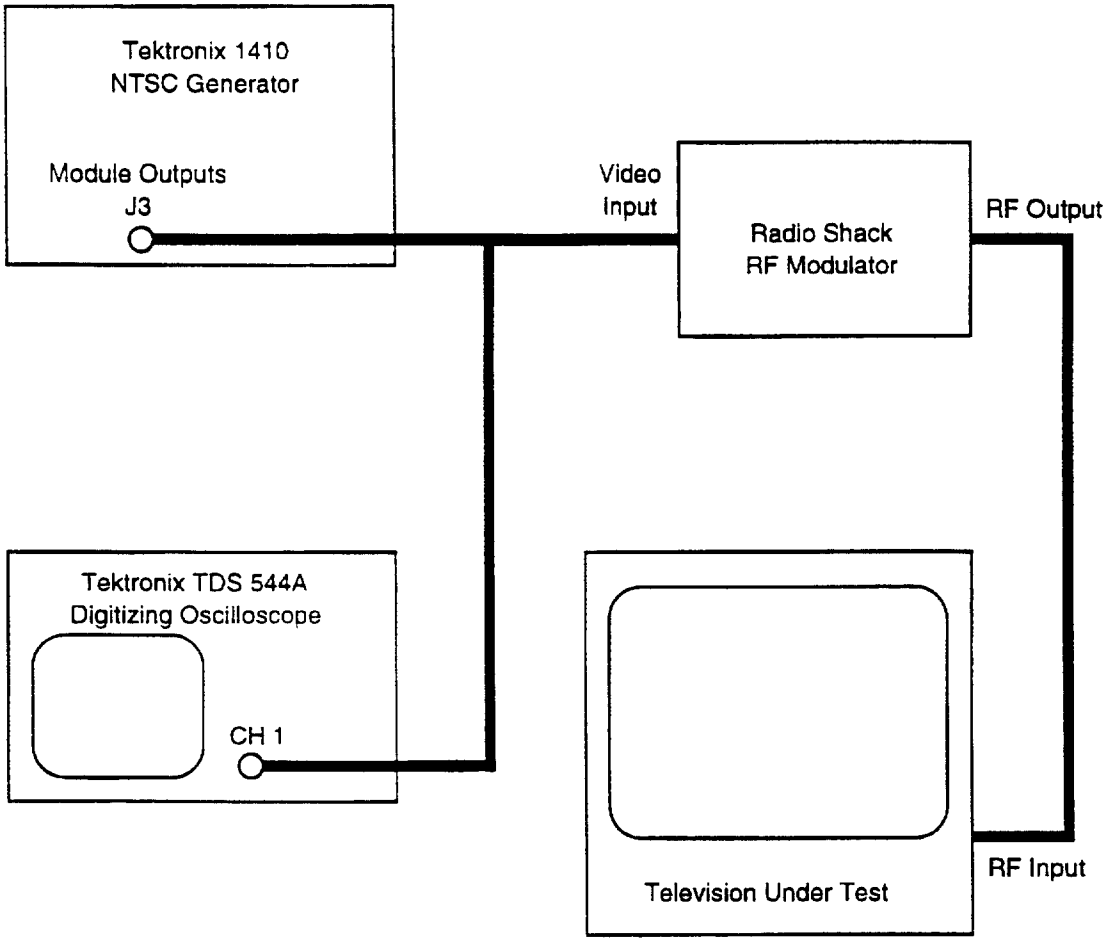

Figure 1. Equipment Set Up

4. 1410 initialization:

   Note: The only controls which affect operation are in the **SWITCHER** module.

   - **CONV KEY** pressed in
   - **C** pressed in
   - **CROSSHATCH / VERT LINES** pressed in
   - All other switches should be out

5. 544 initialization:

   A. Recall the setup **TEK00000.SET (94-01-03)** from the floppy disk.

   B. Select **VIDEO** trigger.

   C. Press **CURSOR** then **CLEAR MENU.**